Alcatel-Lucent 7750 SR

SERVICE ROUTER

The Alcatel-Lucent 7750 Service Router (SR) delivers a powerful set of IP routing and service delivery capabilities with industry leading throughput, density, reliability, and service depth. Supporting up to one full terabit of throughput and the ability to deliver any type of service or application over a unified IP/MPLS network, the 7750 SR is ideal for service providers and cable MSOs with requirements for next-generation triple play, IPTV, business VPN, enhanced Internet, mobile core/backhaul, and classical L2/L3 routing services.

Alcatel-Lucent is at the forefront of the development and delivery of ultra-scalable IP/MPLS networks. With a vision and commitment to solve the networking complexities and continuous challenges driven by the use of video and multimedia applications and the convergence of residential, business and mobile networks, Alcatel-Lucent has delivered the innovative, leading-edge Service Router portfolio for the new service edge.

With Alcatel-Lucent's new and innovative silicon technology and continued platform evolution, the Alcatel-Lucent 7750 Service Router (SR) has evolved seamlessly into a terabit service router platform with industry-leading high availability, scalability of routing and services, multi-service density, service depth, a comprehensive OAM toolkit, and continued investment protection for many years to come. A key member of the Service Router portfolio, the 7750 SR has proven capable to evolve "in place" to ensure years of continued service, reduced capital and operational expenses, and the ability to continuously support the deployment of new leading edge services.

A highly programmable terabit routing platform, the Alcatel-Lucent 7750 SR delivers IPv4- and IPv6-based services, including IPv6-based IP virtual private networks (IP VPNs), Internet exchange peering and IP transit services, and the virtualization of advanced services to enable next-generation service creation. Designed from its inception to enable triple play, premium virtual private network (VPN) and multimedia mobile services, the 7750 SR delivers comprehensive service-aware and customer-aware granularity to support complex edge routing and aggregation routing applications, making it the platform of choice for IP/MPLS network convergence.

Alcatel-Lucent is committed to helping sustain a green, eco-friendly planet. We recognize the importance that a green telecommunications industry has on the overall environment and the beneficial impact that our technology and products can provide in helping our customers meet their energy reduction goals. With leading advances in thermal efficiency, power efficiency and silicon design, the 7750 SR is uniquely positioned to help operators meet their energy efficiency and environmental goals.

Unlike legacy Internet era routers whose forwarding performance drops off when complex services are enabled and have expensive, highly disruptive and unproven migration strategies for next-generation service delivery, the Alcatel-Lucent 7750 SR delivers superior routing performance, highly available services, simultaneous support for Layer 2 and Layer 3 services to any port, the virtualization of advanced services, and investment preservation that leverages all in-place hardware for incremental performance gains and service expansion. Furthermore, the 7750 SR is production-proven, targeted at service providers, MSOs, mobile operators, Internet service providers, application service providers and industry and public sector (IPS) customers (operators), and has become the routing platform of choice for large-scale IP network transformation projects the world over.

Terabit Routing

At the heart of the Alcatel-Lucent 7750 SR is the fully programmable, highly-flexible FP packet processing silicon technology. Based on state-of-the-art network processing technology, the Alcatel-Lucent FP processing complex provides industry-leading performance, service depth and feature velocity. A revolutionary breakthrough in silicon technology, Alcatel-Lucent's new FP2 packet processing technology now delivers 100 Gb/s (half duplex) throughput and delivers an optimal combination of performance and service flexibility to support hardware-based IP/MPLS, IPv4 and IPv6 routing, granular traffic management, and high-touch packet services in a single routing complex. FP technology delivers a high degree of scalability with performance predictability, with no tradeoff between terabit performance and advanced service delivery. FP technology enables rich and robust edge-routing and core-routing capabilities, supporting the full complement of IP routing and multiprotocol label switching (MPLS) protocols, and it also delivers highly scalable multicast services.

Each FP processing complex is composed of customized, fully programmable processors. These processors are optimized for fast packet manipulation, allowing the Alcatel-Lucent 7750 SR to deliver the speed, density and packet processing intelligence required to enable advanced Layer 3 services while ensuring the continuity of legacy Layer 2 services over the IP/MPLS network infrastructure. The programmable attributes of FP technology enable unparalleled feature velocity, whereby new features such as IPv6-based IP VPNs are software and microcode enhancements requiring no hardware changes, allowing for rapid service introduction.

Leveraging FP2 technology, the Alcatel-Lucent 7750 SR delivers 50 Gb/s (full duplex) throughput per slot and scales to a total platform capacity of 1 Tb/s. In addition, FP technology supports all interface types, so common silicon is used across platform interface modules, enabling absolute service consistency with complete interoperability. Purpose-built and optimized for high-demand environments, FP technology enables the 7750 SR to deliver a variety of complex consumer, business and mobile services with granular per-service and/or per-subscriber controls.

The Alcatel-Lucent service router portfolio delivers some of the highest levels of energy efficiency in the market. Driven by our innovative and highly energy efficient FP2 chipset — the Industry's first 100G packet processing silicon with a power efficiency of just 0.6 Watts per Gigabit — Alcatel-Lucent technology enables the 7750 SR to handle greater traffic volumes in a smaller physical footprint while consuming less power per Gigabit than competitive products.

Seamless upgrade to terabit routing

Networks using current generation FP technology are fully and seamlessly upgradable to FP2 and terabit routing, thereby fully preserving operators' current investments and extending them well into the future. Multi-generational interoperability between IOMs, Media Dependent Adapters (MDAs), IMMs and Integrated Service Adapters (ISAs) allows operators to leverage all in-place hardware, enabling them to achieve incremental performance and service gains with no compromise on performance. In addition, to simplify sparing requirements, IOMs, MDAs, IMMs, ISAs, and Switch Fabric/Control Processor Modules (SF/CPMs) are portable between the platforms.

Service routing superiority

The Alcatel-Lucent 7750 SR is a highly scalable routing platform that delivers high-touch packet processing to enable next-generation service creation without compromising forwarding performance and service depth. The market-leading innovation of FP2-based packet processing complex gives the 7750 SR wire-speed packet tunnel encapsulation and access control list (ACL) filtering, forwarding tables that scale to 3 million IPv4 and IPv6 addresses, and 64,000 service queues per Input/Output Module 3-XP (IOM3-XP), enabling up to eight distinct priority levels per subscriber, with no packet loss. For edge and core

routing applications, the 7750 SR supports standards-based implementations of the full range of unicast and multicast routing protocols: Border Gateway Protocol (BGP-4), Intermediate System-to-Intermediate System (IS-IS), Open Shortest Path First (OSPF) v3, Internet Group Management Protocol (IGMP) v3 and Protocol Independent Multicast — Sparse Mode (PIM-SM). The 7750 SR uses the Alcatel-Lucent Service Router Operating System (SR OS) image, across all platforms, for operational simplicity and in order to provide a highly scalable software foundation that is tightly integrated with the FP technology architecture.

The Alcatel-Lucent 7750 SR fully supports a dual IPv4/IPv6 stack, allowing for the simultaneous delivery of IPv4- and IPv6-based services with no performance impact. The dual stack allows the operator to deliver IPv6-based services on a per-customer basis, negating the need to migrate the entire network to IPv6. IPv6 support includes IPv6 provider edge routing, full multicast support and non-stop routing on OSPF, IS-IS and BGP4, enabling a number of applications, including IPv6 provider edge (6VPE) for IP VPNs, IPv6 Internet exchange peering, and IPv6-based Internet services. The comprehensive dual-stack feature set is suitable for all major application deployment types, which include IPv4/v6 triple play, IPv4/v6 business VPN services and IPv4/v6 wireless broadband access/backhaul beyond switched and routed services network boundaries.

MPLS

Multiprotocol Label System (MPLS) is field proven, follows a highly consolidated standardization process, and is the key enabling technology for IP network and service transformation — for the aggregation, edge and core network segments. Consistent with the attributes of MPLS, the Alcatel-Lucent 7750 SR enables the full range of Layer 2 and Layer 3 protocols such as Ethernet, Frame Relay, ATM, BGP-4, IS-IS and PIM-SM to make it the platform of choice for enabling network convergence. The 7750 SR supports the full range of the IEFT's architecture, stack, traffic engineering (TE), signaling, Pseudowire Emulation Edge-to-edge (PWE3) and OAM standards for service tunneling flexibility. The 7750 SR is capable of delivering any combination of services to any port, without a tradeoff between throughput and service depth. For operators moving to an all-IP network, the 7750 SR supports synchronous Ethernet (Sync-E) for SONET/SDH-like synchronization performance to enable the distribution of precision network timing and synchronization over Ethernet transport links.

High availability

The Alcatel-Lucent 7750 SR was purpose-built from its inception to guarantee the highest levels of availability, resiliency and redundancy from hardware and software architectures. The 7750 SR is a fully redundant platform with hot-swappable components, including interface modules, power supplies, and Switch Fabric/Control Processor Module (SF/CPM), with no single point of failure. In addition to hitless in-service software upgrades, MPLS TE graceful shutdown, graceful restart — helper mode, fast reroute and multichassis automatic protection switching (APS) on SONET/SDH links, the 7750 SR established an industry benchmark with non-stop routing, non-stop services and multichassis Link Aggregation Group (LAG). The industry-leading high-availability features of the 7750 SR have been validated by BT Exact, an industry-recognized third-party test organization. The 7750 SR maximizes the quality of the user experience with uninterrupted subscriber sessions, fully enforceable stringent SLAs, and lifeline services delivery.

Multi-service flexibility

The Alcatel-Lucent 7750 SR leverages the sophisticated FP technology to deliver unmatched multi-service flexibility and service-aware quality of service (QoS) capabilities, with the service depth that higher-margin services require. The 7750 SR has a highly scalable service-aware architecture capable of providing simultaneous support for triple play, mobile, Virtual Private LAN Services (VPLS), Virtual Private Wire Services (VPWS), PBB-based services, enhanced Internet services, and IP virtual private network (VPN) services. It has the field-proven performance to scale BGP peers, routing and forwarding tables, Layer 2 and Layer 3 service instances, pseudowire terminations, and service queues to concurrently support the most demanding consumer, business and mobile services. The robustness of the 7750 SR to converge multiple services over one IP/MPLS network has been validated in independent tests by Isocore, an industry-recognized third-party test organization.

Service-aware QoS provides service-based queuing, policing and shaping, with per-service bandwidth guarantees to meet the most demanding SLAs. For increased service differentiation, the Alcatel-Lucent 7750 SR delivers service-aware Hierarchical Quality of Service (H-QoS) and accounting for innovative service bundles. This helps guarantee the performance of each forwarding class in terms of bandwidth, delay and jitter, while allowing lower priority traffic to burst when higher priority applications go idle. To ensure service continuity with legacy services, the 7750 SR supports network and service interworking using Ethernet, Frame Relay, and ATM psuedowires for advanced VPWS over the IP/MPLS backbone.

Service integration and virtualization

The Alcatel-Lucent 7750 SR further increases service depth by integrating advanced services into the platform using an ISA. With intelligent Layer 3 to Layer 7 service capabilities, the 7750 SR unifies advanced services integration with high-touch services and ushers in a new realm of convergence.

ISAs, half-slot MDA form factor adapters, extend the level of intelligence of the industry-leading Service Router platform by virtualizing advanced service capabilities into a single, unified IP/MPLS and/or Carrier Ethernet service edge. The ISAs provide purpose-built, extended functionality to the 7750 SR, enabling deeper levels of service capabilities typically available only from external dedicated, network-attached appliances.

The Application Assurance Integrated Service Adapter (AA-ISA) significantly extends the service depth and functionality of the 7750 SR by virtualizing advanced application intelligence with extensive subscriber policy and traffic management capabilities. The AA-ISA enables operators to deliver personalized and QoS-managed online services that provide added value to subscribers, content owners, application providers, advertisers, and other key members in the value chain by delivering a superior quality of experience. The IPSec-Integrated Service Adapter (IPSec-ISA) provides comprehensive network-integrated Layer 3 IPSec virtual private network (VPN) deployment options, such as Remote Access Concentrator (RAC), site-to-site and network-to-network encrypted IPSec security. In addition, the IPSec ISA can be used to provide secure connectivity for wireless backhaul traffic and to support Layer 3 forwarding down an interface tied to an IPSec tunnel.

In addition to having the industry's first high-density and energy efficient Terabit service router, our new Integrated Service Adapter (ISA) technology enables us to consolidate the functionality of separate single-function appliances directly into the service router. The ISA's multi-function service capabilities enable customers to deliver advanced, value-added services with high performance while reducing rack space, power, and cooling requirements.

Enabling IPTV and broadband video

The Alcatel-Lucent 7750 SR plays a critical role in triple play service delivery. Service-aware H-QoS provides queuing on a per-service, per-subscriber basis with up to eight ingress and egress service queues per subscriber for up to 20,000 subscribers in total per slot (using the High Scale MDA). For efficient video service delivery, the 7750 SR supports PIM-SSM at the edge to deliver multicast services across the IP core, and VPLS along with IGMP snooping for cost and performance-optimized multicast distribution in the metro areas. Enhanced subscriber management supports a universal approach to managing subscriber identities, profiles and SLAs across a range of deployment models, and it enables dynamic autoprovisioning of subscriber and service policies, supporting both RADIUS- and Dynamic Host Configuration Protocol (DHCP)-based approaches. The versatility of the 7750 SR supports any mode of operation, allowing the implementation of Layer 2- or Layer 3-based deployment models such as DHCP and Point-to-Point Protocol over Ethernet (PPPoE), along with flexible migration from legacy broadband remote access servers.

Within the video core backbone, the 7750 SR can act as a broadband video router and offer the operator a rich set of powerful Layer 3 features that provide scalability and bandwidth efficiency along with reliability and operational ease. In addition to PIM-SM and PIM-SSM support, the 7750 SR can be used within an IP routed core to participate in native PIM, or to represent endpoints of GRE or MPLS tunnels for BTV delivery between regional and national video offices.

Business-critical services

The Alcatel-Lucent 7750 SR helps operators address the growing demand for higher bandwidth business-critical services and reduce the total cost of ownership through industry-leading IP transformation. The 7750 SR-based business services solution supports both Layer-2 Carrier Ethernet 2.0 and Layer-3 IP-VPNs on the same platform, with flexible interface options, which allows operators to support any-to-any connectivity regardless of access technology differences. For service providers and MSOs who want to deploy robust and highly reliable MEF-certified networks, the 7750 SR is MEF 9- and MEF 14-certified.

The 7750 SR-based single aggregation network allows operators to meet existing SLA(s) and offer premium SLA(s) for higher-margin business VPN services, using the inherent differentiated capabilities of the 7750 SR platform. Service-aware H-QoS permits per business-subscriber (site), per service granularity for tailored SLAs that relate directly to the networking objectives of the enterprise. Service-aware OAM ensures that these services can be fully managed end-to-end. Fast, accurate and fully integrated service provisioning, management and restoration allow operators to have full visibility of network and service profile capabilities to manage services end-to-end. Also, with addition of integrated business AA ISA capability, operators can offer high-margin services with stringent SLA(s) for business applications.

In addition to full standards-based support for VPLS and PBB, the Alcatel-Lucent 7750 SR delivers another technology innovation first by tightly integrating PBB with

VPLS. The integrated solution combines the scalability benefits of PBB and the resiliency, traffic engineering and convergence benefits of VPLS. The integration of PBB with VPLS enables operators to leverage their existing metro Ethernet infrastructure, providing interoperability between native Ethernet and VPLS, while expanding their service to reach national or international markets. Leveraging the programmability of FP technology, PBB was introduced through software, without any hardware upgrades. The industry-leading standards-based flood containment and tiered resiliency mechanisms for PBB-VPLS provide improved reliability and flexibility for end-to-end Ethernet services.

Leadership in mobile IP network transformation

The Alcatel-Lucent 7750 SR is also fully equipped to enable mobile network transformation and convergence. By integrating TDM, ATM and Ethernet traffic, the 7750 SR simplifies and scales CDMA/EVDO and GSM/UMTS/HSPA networks, enabling evolution to an efficient all-IP transport network and removing barriers to offering new services. To handle bandwidth-intensive IP data services, Multilink Point-to-Point Protocol (MLPPP), ATM Inverse Multiplexing over ATM (IMA) and multichassis automatic protection switching (MC-APS) are supported. Circuit Emulation Service (CES) standards, either CES over Packet (CESoP) or Structure-Agnostic Transport over Packet (SAToP), enable the backhauling of 2G and 3G network traffic over IP/MPLS or Ethernet. The 7750 SR delivers advanced synchronization techniques and allows flexible options for transport of timing over packet networks (line timing, BITS, adaptive and differential clock recovery, Synchronous Ethernet). CDMA/EV-DO operators can facilitate network provisioning and operation with configurable QoS profiles for multi-class MLPPP. The use of multi-class MLPPP enables efficient multi-class traffic convergence and extends the life of costly backhaul links.

Also, the Alcatel-Lucent 7750 SR safeguards investments by offering the ability to seamlessly and smoothly transition to 4G (WiMAX, LTE). Using the 7750 SR, mobile operators can allow the seamless coexistence of 2G and 3G mobile technologies with reliable and efficient bearer and control transport of 4G mobile traffic.

Unmatched multi-service density

With highly-flexible, modular physical network interface options, the Alcatel-Lucent 7750 SR provides industry-leading Ethernet density along with a full breadth of interface types, including packet over SONET/SDH (PoS), circuit emulation services (CES) and ATM. Portable across platforms, MDAs, IOMs and IMMs provide modularity and configuration flexibility.

MDAs are hot-swappable, half-slot adapters that insert into a full-slot 7750 SR IOM. Supporting up to two MDAs, the IOM provides fully distributed forwarding and packet services and delivers the full complement of the Alcatel-Lucent SR OS capabilities for the 7750 SR. The 7750 SR MDAs deliver comprehensive IEEE 802.3 compliance and in conjunction with the selected IOM, provide multi-service support for Layer 2 and Layer 3 IPv4 and IPv6 routed services, IP/MPLS, Ethernet over MPLS (EoMPLS), VPLS, and VPWS with a highly personalized service context. When used with IOM3-XPs, MDA-XP variants provide 25 Gb/s (full duplex), boost slot capacity to 50 Gb/s (full duplex) and support synchronous Ethernet (sync-E) on optical MDA-XPs. Also, MDAs use small form factor pluggable (SFP) optics to provide greater flexibility by populating MDAs with the required optics on a per-port basis.

For true multi-service, multi-encapsulation interface flexibility, the Any Service Any Port (ASAP) Media Dependent Adapter (MDA) converges diverse interfaces and protocols onto a common MDA for the 7750 SR. Each ASAP MDA port can be independently configured to deliver clear channel or channelized connections — supporting from DS0 up to the maximum port speed, with increments through DS3/E3, OC-3/STM-1 and OC-12/STM-4. Each port or channel can be configured with any combination of Layer 2 and Layer 3 services, and each port or channel's upper layer encapsulation can be flexibly configured to support Ethernet, Frame Relay, Point-to-Point Protocol (PPP), Packet over SONET (POS), Asynchronous Transfer Mode (ATM), and High-Level Data Link Control (HDLC). Additionally, the ASAP MDA supports channel bundling using Multi-Link PPP (MLPPP) and ATM Inverse Multiplexing over ATM (IMA) over multiple DS1/E1 links, enabling service operators to offer very granular bandwidth services and a broader range of tiered offerings.

Designed for specialized, very dense Ethernet routing applications requiring high density and high throughput, Integrated Media Modules (IMMs) combine a fully distributed forwarding and packet processing services engine with fixed 10/100, gigabit, and 10 gigabit Ethernet ports. With full support for IP routing and multiprotocol label switching (MPLS), 7750 SR IMMs support the full range of layer 2 and IPv4/IPv6-based layer 3 services, including virtual private LAN services (VPLS), enhanced Internet, and IP virtual private network (IP VPN) services. Leveraging FP2 technology, the IMM delivers 50 Gb/s (full duplex) slot capacity, features comprehensive IEEE 802.3 compliance, sync-E on optical modules, and it supports a broad range of copper and pluggable optical interfaces. Using the IMM, the 7750 SR delivers industry-leading densities, with up to 80 10GigE and 480 GigE ports per chassis. This translates to a density of 240 10GigE and 1,440 GigE ports in a seven-foot rack.

Service-aware OAM

With a purpose-built, service-aware framework, the Alcatel-Lucent 7750 SR offers unprecedented simplification and cost reduction of network operations through rapid diagnosis of

network and service level faults, early detection of component and service degradation, and a highly automated process of isolating network-induced errors. The 7750 SR service-aware OAM tools include service assurance agent (SAA) tests with scheduling and hardware timestamps, Bidirectional Forwarding Detection (BFD), service ping, LSP ping and traceroute, VPLS ping and traceroute, service mirroring, virtual circuit connectivity verification, IEEE 802.1ah, and a suite of multicast troubleshooting tools. These tools are integrated into the Alcatel-Lucent 5620 Service Aware Manager (SAM), which uses a GUI to ensure rapid fault isolation.

To enable operators to meet lawful intercept (LI) requirements, the Alcatel-Lucent 7750 SR LI supports a non-service-affecting LI that provides an assurance of confidentiality and security for the LI administrator, activities and information. To meet the size and scale of LI regulatory and customer SLA requirements, the flexibility of the 7750 SR LI implementation provides various deployment options. The 7750 SR formally separates the control planes between the LI agency and the network administrator, with completely transparent accounts and operations. Furthermore, each deployment option permits the integration of native and third-party LI interfaces using the 7750 SR LI capability, to minimize churn and support flexible equipment reuse.

Streamlined network management

The Alcatel-Lucent 7750 SR is fully managed by the industry-leading Alcatel-Lucent 5620 SAM, Alcatel-Lucent 5650 Control Plane Assurance Manager (CPAM) and the 5670 Reporting and Analysis Manager (RAM). The 5620 SAM is a single management platform offering the unification of element, network and service management. It gives the operator a comprehensive fault management system with which to perform root cause analysis, schedule a suite of OAM tests for SLA compliance, run predefined test suites, set threshold crossing alerts to detect potential SLA violations, and simplify service provisioning with GUI-based templates.

The 5650 CPAM is an IP/MPLS multivendor-compatible control plane management solution. It enables operators to assure network and service availability against control plane misconfigurations, malfunctions and undetected routing updates, as well as to accelerate service problems resolution over an IP/MPLS infrastructure.

The 5670 Reporting and Analysis Manager (RAM) enables network-wide application-aware visibility and planning insight for Triple Play managed online services. The 5670 RAM collects, warehouses and analyzes IP/MPLS traffic flow data provided by the Alcatel-Lucent 7750 SR, which is equipped with AA-ISAs for accurate and timely decision-support intelligence on subscribers, applications, and IP traffic flows. Together, the Alcatel-Lucent 7750 SR, the 5620 SAM, 5650 CPAM and 5670 RAM form the industry's most comprehensive unified IP network resource and service management solution.

Chassis options

The Alcatel-Lucent 7750 SR portfolio enables cost-optimized next-generation infrastructure build-outs with three chassis options for a right-sized solution — SR-12, SR-7 and SR-1 — all of which offer leading throughput and density, the ability to mix and match a wide range of interface types, and the portability of modules across the platforms. The 12-slot SR-12 chassis provides 1 terabit (half duplex) of throughput, the seven-slot SR-7 delivers 500 Gb/s (half duplex) of throughput, and the single-slot SR-1 delivers 40 Gb/s (half duplex) of throughput.

7750 SR-12

System throughput
- Switch fabric: Up to 1 Tb (half duplex)
- Slot capacity: Up to 50 Gb/s (full duplex)

IOMs supported
- IOM-2
- IOM3-XP

Number of IOMs supported per chassis
- 10 – Any mix of IOM-2 or IOM3-XP

Number of half-slot of MDAs per chassis
- 20 – Any mix of MDA or MDA-XP

IMMs supported
- 4 port 10GigE (XFP) IMM
- 8 port 10GigE (XFP) IMM
- 48 port GigE (SFP) IMM
- 48 port GigE (10/100/1000Base-T) IMM

Redundancy
- SF/CPM, power, fans

Hot-swappable modules
- SF/CPM, power, fans, IOM, MDA, IMM, ISA

Dimensions
- Height: 62.2 cm (24.5 in.)
- Width: 44.4 cm (17.5 in.)
- Depth: without cable: 64.5 cm (25.4 in.); with cable: 76.5 cm (30.1 in.)

Weight
- Empty: 33.1 kg (73 lb)
- Loaded: 136 kg (300 lb) approx.

Power
- -40 V DC to -72 V DC (nominal)
- 90A to 162A
- 1+1 redundancy

Cooling
- Front-to-back air flow

7750 SR-7

System throughput
- Switch fabric: Up to 500 Gb/s (half duplex)
- Slot capacity: Up to 50 Gb/s (full duplex)

IOMs supported
- IOM-2
- IOM3-XP

Number of IOMs supported per chassis
- 5 – Any mix of IOM-2 or IOM3-XP

Number of half-slot of MDAs per chassis
- 10 – Any mix of MDA or MDA-XP

IMMs supported
- 4 port 10GigE (XFP) IMM
- 8 port 10GigE (XFP) IMM
- 48 port GigE (SFP) IMM
- 48 port GigE (10/100/1000Base-T) IMM

Redundancy
- SF/CPM, power, fans

Hot-swappable modules
- SF/CPM, power, fans, IOM, MDA, IMM, ISA

Dimensions
- Height: 35.5 cm (14.0 in.)
- Width: 44.4 cm (17.5 in.)
- Depth: 59.7 cm (25.5 in.)

Weight
- Empty: 27.2 kg (60 lb)
- Loaded: 70.3 kg (155 lb) approx.

Power
- -40 V DC to -72 V DC (nominal)
- 52A to 93A
- 1+1 redundancy

Cooling
- Side-to-back air flow

7750 SR-1

System throughput
- Switch fabric: Up to 40 Gb/s (half duplex)
- MDA half-slot capacity: Up to 10 Gb/s (full duplex)

IOMs supported
- Integrated IOM and SF/CPM

Number of IOMs supported per chassis
- Not applicable

Number of half-slot of MDAs per chassis
- 2 – Any mix of MDA or MDA-XP

IMMs supported
- None

Redundancy
- Power

Hot-swappable modules
- Power, integrated IOM and SF/CPM, MDA

Dimensions
- Height: 6.6 cm (2.6 in.)
- Width: 44.4 cm (17.5 in.)
- Depth: 56.4 cm (22.2 in.)

Weight
- Empty: 12.3 kg (27 lb)
- Loaded: 13.2 kg (29 lb) approx.

Power
- 110 V AC or 220 V AC
- -40 V DC to -72 V C (nominal)
- 10 A to 6 A
- 1+1 redundancy
- AC available with external shelf

Cooling
- Side-to-side air flow

Physical interface
- SF/CPM
  - ¬ 7750 SR-12 – 1 Tb/s (half duplex)
  - ¬ 7750 SR-7 – 500 Gb/s (half duplex)
- Input/Output Modules
  - ¬ IOM3-XP – 50 Gb/s (full duplex)
  - ¬ IOM-2 – 20 Gb/s (full duplex)
- Integrated Media Modules
  - ¬ 50 Gb/s (full duplex)
- Integrated IOM and SF/CPM (7750 SR-1 only)
  - ¬ With integrated switch fabric and CPU (1 GB)

Table 1. 7750 SR MDA and MDA-X summary and chassis port density P

MDA TYPE	PORT COUNT	INTERFACE TYPE	SR-1	SR-7	SR-12
ETHERNET MDA-XPs					
1000Base*	20	SFP	40	200	400
10/100/1000Base	20	RJ-45	40	200	400
10GBase*	2	XFP	4	20	40
10GBase (Over-subscribed)*	4	XFP	8	40	80
ETHERNET MDAs					
10/100/1000Base-TX	20	RJ-45	40	200	400
100Base-FX	20	SFP	40	200	400
10/100Base-TX	60	5 x mini RJ-21	120	600	1200
1000Base (5-port)	5	SFP	10	50	100
1000Base (10-port)	10	SFP	20	100	200
1000Base (20-port)	20	SFP	40	200	400
1000Base High Scale	10	SFP	20	100	200
10GBase/1000Base (Over-subscribed)	1/10	SFP/XFP	2/20	10/100	20/200
10GBase (LAN/WAN PHY)	1	Simplex SC	2	10	20
10GBase (LAN PHY)	1	XFP	2	10	20
10GBase (LAN PHY) (Over-subscribed)	2	XFP	4	20	40
PoS MDAs					
OC-3c/STM-1c	8	SFP	16	80	160
OC-3c/STM-1c	16	SFP	32	160	320
OC-3c/STM-1c/OC-12c/STM-4c (Multirate)	8	SFP	16	80	160
OC-3c/STM-1c/OC-12c/STM-4c (Multirate)	16	SFP	32	160	320
OC-48c/STM-16c	2	SFP	4	20	40
OC-48c/STM-16c	4	SFP	8	40	80
OC-192c/STM-64c with SR-1/I-64.1 Optic	1	Simplex SC	2	10	20
OC-192c/STM-64c with IR-2/S-64.2 Optic	1	Simplex SC	2	10	20
OC-192c/STM-64c with LR-2/L-64.2 Optic	1	Simplex SC	2	10	20
ANY SERVICE ANY PORT MDAs					
Chan. DS3/E3 Any Service Any Port (ASAP)	4	Mini SMB	N/A	40	80
Chan. DS3/E3 ASAP	12	Mini SMB	N/A	120	240
Chan. OC-3/STM-1 ASAP	4	SFP	N/A	40	80
Chan. OC-12/STM-4 ASAP	1	SFP	N/A	10	20
CIRCUIT EMULATION SERVICE MDAs					
Chan. OC-3/STM-1 Circuit Emulation Services (CES)	1	SFP	N/A	10	20
ATM MDAs					
ATM OC-3c/STM-1c/OC-12c/STM-4c (Multirate)	4	SFP	8	40	80
ATM OC-3c/STM-1c	16	SFP	32	160	320
OTHER					
Versatile Service Adapter	N/A	N/A	2	10	20

* Note: Provides support for Synchronous Ethernet (Sync-E)

Table 2. 7750 SR IMM Summary and Chassis Port Density

IMM TYPE	PORT COUNT	INTERFACE TYPE	SR-1	SR-7	SR-12
10GBase *	4	XFP	N/A	20	40
10GBase (oversubscribed) *	8	XFP	N/A	240	80
10/100/1000GBase *	48	SFP	N/A	240	480
10/100/1000Base	48	RJ-45	N/A	240	480

* Note: Provides support for Synchronous Ethernet (Sync-E)

Table 3. 7750 SR ISA summary

ISA TYPE	QUANTITY
Application Assurance Integrated Service Adapter (AA-ISA)*	1 + 1 for redundancy
IPSec Integrated Service Adapter (IPSec–ISA) ^	4 + 1 for redundancy

* Note: Supported on IOM-2 or IOM3-XP
^ Note: Supported only on IOM-2

Software support

Services

- IP VPN (RFC 4364)
- IPv6-based IP VPN
- VPWS point-to-point Layer 2 VPN
- VPLS multipoint Layer 2 VPN (RFC 4762)
- Direct Internet access
- CES
- Mobile transport
- IP multicast support with Virtual Private Routed Network (VPRN) using "draft Rosen"
- PWE3 using "draft Martini" encapsulation
- Generic routing encapsulation (GRE)
- PBB based on IEEE 802.1ah
- PBB & VPLS integration
- Synchronous Ethernet ITU Sync-E G.8261, G.8261, G.8264 standards compliant
- Synchronous Ethernet ITU Sync-E G.8263 for synchronous status messaging (SSM) is hardware ready

Quality of Service

- Per-service QoS with per-service queuing, shaping and policing
- Hierarchical queuing and scheduling
- Ingress and egress buffering (up to 200 ms at 25 Gb/s in each direction)
- Committed information rate (CIR), peak information rate (PIR), maximum burst size (MBS) queue parameters
- Thousands of ingress and egress operations
- Programmable queues with CIR/PIR enforcement
- Premium, assured and best-effort forwarding classes
- IEEE 802.1p filtering/marking/re-marking
- IETF differentiated services code point (DSCP) filtering/marking/re-marking
- Weighted random early detection (WRED) on ingress and egress
- Packet marking (DiffServ)
- Traffic shaping and policing (ingress and egress)
- DSLAM ID as a secondary shaper
- Packet and byte counter statistics (ingress and egress)

Security

- Wirespeed ACLs
- MD5 password encryption and authentication for routing protocols
- Classification and prioritization of control traffic
- Secure Shell (SSH) v1/v2 and Secure Copy (SCP)
- IEEE 802.1x port-based authentication
- Prevention of unauthorized communication between DSL subscribers
- DHCP-based automatic IP/MAC filter and static Address Resolution Protocol (ARP) cache population for DSL subscribers
- Dedicated management Ethernet routing instance
- Control processor module queuing (CPMQ); separate hardware-based CPM queues allocated on a per-peer basis
- Inbound and outbound LDP label binding filtering
- Limitation of MAC address moves between VPLS instances
- CPM filter based on MAC criteria

Lawful Intercept

- Highly-flexible Intercept Access Point (IAP) mirroring supports LI mirroring on a per-subscriber, per-service, per-flow and per-network IAP basis
- Full content mirroring includes signaling, routing and switched data traffic
- Flexible packet size for mirrored LI traffic enables full or partial packets to be mirrored
- Local and remote LI mirroring
- Layer 2 and Layer 3 services LI mirroring of both routed (Layer 3) and switched (Layer 2) services, which includes IP VPN, IES, VLL, VPLS and CES
- Comprehensive set of LI mirroring-capable interfaces supports subscriber- and classification-based interception mirroring across a wide set of interfaces – supported interfaces include TDM, ATM, Frame Relay, SONET/SDH, Ethernet, virtual LAN (VLAN), link aggregation group, and circuit emulation service.
- Configurable QoS for mirrored LI traffic locally on the network element and across the network
- The data-plane supports line-rate switching for the traffic aggregate – the total original and mirrored traffic

Management

- Alcatel-Lucent 5620 SAM provides extensive Fault, Configuration, Accounting, Performance, and Security (FCAPS)
- Alcatel-Lucent 5650 CPAM provides control plane management solution
- The 5670 Reporting and Analysis Manager (RAM) enables network-wide application-aware visibility and planning insight for TPSDA managed online services
- Fully featured industry CLI, including service CLI
- SSH v1/v2 and Telnet
- FTP, TFTP and SCP
- RADIUS (AAA)
- TACACS+
- SNMP v1, v2c and v3
- Local and remote port/service/flow mirroring
- Service assurance tools, including service ping, SDP ping, LSP ping, MAC ping and MAC traceroute
- Path maximum transmission unit (MTU) size measurement
- Round-trip delay, jitter, loss measurement (SAA)

Safety standards and compliance agency certifications

Safety

- EN 60590-1
- IEC 60950-1CB Scheme
- CSA/UL 60950-1 NRTL
- FDA CDRH 21-CFR 1040
- EN 60825-1
- EN 60825-1\2
- IEC 60825-1
- IEC 60825-2

EMC

- ICES-003 Class A
- FCC Part 15 Class A
- EN 300 386
- EN 55022
- EN 55024
- EN 61000-4-2
- EN 61000-4-3
- EN 61000-4-4
- EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-11
- IEC CISPR22
- AS/NZS CISPR 22

Immunity

- EN 61000-3-2 Power Line Harmonics
- EN 61000-3-3 Voltage Fluctuations and Flicker
- EN 61000-4-2 Electric Static Discharge
- EN 61000-4-3 Radiated Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 Low Frequency Common Immunity
- EN 61000-4-11 Voltage Dips and Sags

Telecom

- Telcordia GR-253-CORE Issue 3
- IEEE 802.3 (Gigabit Ethernet, Ethernet)
- ANSI T1.105.03

- ANSI T1.105.06
- ANSI T1.105.09
- ANSI T1.403 (DS1)
- ANSI T1.404 (DS3)
- ITU-T G.957
- ITU-T G.825
- ITU-T G.824
- ITU-T G.823
- ITU-T G.813
- ITU-T G.707
- ITU-T G.703

Environmental

- ETS 300 019-1-1, Storage Tests, Class 1.2
- ETS 300 019-1-2, Transportation Tests, Class 2.3
- ETS 300 019-1-3, Operational Tests, Class 3.2
- ETS 300 019-2-4, pr A1 Seismic

Environmental specifications

- Operating temperature: 0°C to 40°C (32°F to 104°F)
- Relative humidity: 15% to 85% (operating)
- Relative humidity: 5% to 90% (non-condensing)
- Operating altitude: sea level to 3048 m (10,000 ft)

Electronic equipment devices

- WEEE
- RoHS
- R&TTE
- China CRoHS

Certifications

- Network Equipment Building System (NEBS) Level 3
  - ¬ Telcordia GR-63-CORE, Issue 4, June 2006
  - ¬ Telcordia GR-1089-CORE, Issue 3, March 2006
  - ¬ATT-TP-76200
- CE

Standards Compliance

IEEE 802.1d Bridging

IEEE 802.1p/Q VLAN Tagging

IEEE 802.1s Multiple Spanning Tree

IEEE 802.1w Rapid Spanning Tree Protocol

IEEE 802.1x Port-Based Network Access Control

IEEE 802.1ad Provider Bridges

IEEE 802.1ah Provider Backbone Bridges

IEEE 802.1ag Service Layer OAM

IEEE 802.3ah Ethernet in the First Mile

IEEE 802.1ak Multiple MAC Registration Protocol

IEEE 802.3 10BaseT

IEEE 802.3ad Link Aggregation

IEEE 802.3ae 10Gbps Ethernet

IEEE 802.3ah Ethernet OAM

IEEE 802.3u 100BaseTX

IEEE 802.3x Flow Control

IEEE 802.3z 1000BaseSX/LX

Protocol Support

OSPF

RFC 1765 OSPF Database Overflow

RFC 2328 OSPF Version 2

RFC 2370 Opaque LSA Support

RFC 2740 OSPF for IPv6 (OSPFv3) draft-ietf-ospf-ospfv3-update-14.txt

RFC 3101 OSPF NSSA Option

RFC 3137 OSPF Stub Router Advertisement

RFC 3623 Graceful OSPF Restart – GR helper

RFC 3630 Traffic Engineering (TE) Extensions to OSPF Version 2

RFC 4203 Shared Risk Link Group (SRLG) sub-TLV

BGP

RFC 1397 BGP Default Route Advertisement

RFC 1772 Application of BGP in the Internet

RFC 1965 Confederations for BGP

RFC 1997 BGP Communities Attribute

RFC 2385 Protection of BGP Sessions via MD5

RFC 2439 BGP Route Flap Dampening

RFC 2547bis BGP/MPLS VPNs

draft-ietf-idr-rfc2858bis-09.txt

RFC 2918 Route Refresh Capability for BGP-4

RFC 3392 Capabilities Advertisement with BGP4

RFC 4271 BGP-4 (previously RFC 1771)

RFC 4360 BGP Extended Communities Attribute

RFC 4364 BGP/MPLS IP Virtual Private Networks (VPNs) (previously RFC 2547bis BGP/MPLS VPNs)

RFC 4456 BGP Route Reflection: Alternative to Full-mesh IBGP (previously RFC 1966 & 2796)

RFC 4724 Graceful Restart Mechanism for BGP – GR helper

RFC 4760 Multi-protocol Extensions for BGP (previously RFC 2858)

RFC 5065 Confederations for BGP (obsoletes 3065)

IS-IS

RFC 1142 OSI IS-IS Intra-domain Routing Protocol (ISO 10589)

RFC 1195 Use of OSI IS-IS for routing in TCP/IP and dual environments

RFC 2763 Dynamic Hostname Exchange for IS-IS

RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS

RFC 2973 IS-IS Mesh Groups

RFC 3373 Three-Way Handshake for Intermediate System to Intermediate System (IS-IS) Point-to-Point Adjacencies

RFC 3567 Intermediate System to Intermediate System (ISIS) Cryptographic Authentication

RFC 3719 Recommendations for Interoperable Networks using IS-IS

RFC 3784 Intermediate System to Intermediate System (IS-IS) Extensions for Traffic Engineering (TE)

RFC 3787 Recommendations for Interoperable IP Networks

RFC 3847 Restart Signaling for IS-IS – GR helper

RFC 4205 for Shared Risk Link Group (SRLG) TLV

draft-ietf-isis-igp-p2p-over-lan-05.txt

LDP

RFC 3036 LDP Specification

RFC 3037 LDP Applicability

RFC 3478 Graceful Restart Mechanism for LDP – GR helper

draft-jork-ldp-igp-sync-03.txt

IPv6

RFC 1981 Path MTU Discovery for IPv6

RFC 2375 IPv6 Multicast Address Assignments

RFC 2460 Internet Protocol, Version 6 (IPv6) Specification

RFC 2461 Neighbor Discovery for IPv6

RFC 2462 IPv6 Stateless Address Auto configuration

RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 Specification

RFC 2464 Transmission of IPv6 Packets over Ethernet Networks

RFC 2529 Transmission of IPv6 over IPv4 Domains without Explicit Tunnels

RFC 2545 Use of BGP-4 Multiprotocol Extension for IPv6 Inter-Domain Routing

RFC 2710 Multicast Listener Discovery (MLD) for IPv6

RFC 2740 OSPF for IPv6

RFC 3306 Unicast-Prefix-based IPv6 Multicast Addresses

RFC 3315 Dynamic Host Configuration Protocol for IPv6

RFC 3587 IPv6 Global Unicast Address Format

RFC3590 Source Address Selection for the Multicast Listener Discovery (MLD) Protocol

RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6

RFC 4007 IPv6 Scoped Address Architecture

RFC 4193 Unique Local IPv6 Unicast Addresses

RFC 4291 IPv6 Addressing Architecture

RFC 4659 BGP-MPLS IP Virtual Private Network (VPN) extension for IPv6 VPN

RFC 5072 IP Version 6 over PPP

draft-ietf-isis-ipv6-05.txt

draft-ietf-isis-wg-multi-topology-xx.txt

Multicast

RFC 1112 Host Extensions for IP Multicasting (Snooping)

RFC 2236 Internet Group Management Protocol (Snooping)

RFC 3376 Internet Group Management Protocol, Version 3 (Snooping)

RFC 2362 Protocol Independent Multicast-Sparse Mode (PIM-SM)

RFC 3618 Multicast Source Discovery Protocol (MSDP)

RFC 3446 Anycast Rendezvous Point (RP) mechanism using Protocol Independent Multicast (PIM) and Multicast Source Discovery Protocol (MSDP)

RFC 4601 Protocol Independent Multicast – Sparse Mode (PIM-SM): Protocol Specification (Revised)

RFC 4604 Using IGMPv3 and MLDv2 for Source-Specific Multicast

RFC 4607 Source-Specific Multicast for IP

RFC 4608 Source-Specific Protocol Independent Multicast in 232/8

RFC 4610 Anycast-RP using Protocol Independent Multicast (PIM)

draft-ietf-pim-sm-bsr-06.txt

draft-rosen-vpn-mcast-08.txt

draft-ietf-mboned-msdp-mib-01.txt

MPLS

RFC 3031 MPLS Architecture

RFC 3032 MPLS Label Stack

Encoding (REV3443)

RFC 4379 Detecting Multi-Protocol Label Switched (MPLS) Data Plane Failures

RFC 4182 Removing a Restriction on the use of MPLS Explicit NULL

RIP

RFC 1058 RIP Version 1

RFC 2082 RIP-2 MD5 Authentication

RFC 2453 RIP Version 2

RSVP-TE

RFC 2430 A Provider Architecture DiffServ & TE

RFC 2702 Requirements for Traffic Engineering over MPLS

RFC2747 RSVP Cryptographic Authentication

RFC3097 RSVP Cryptographic Authentication

RFC 3209 Extensions to RSVP for Tunnels

RFC 4090 Fast reroute extensions to RSVP-TE for LSP Tunnels

Differentiated services

RFC 2474 Definition of the DS Field in the IPv4 and IPv6 Headers (Rev)

RFC 2597 Assured Forwarding PHB Group (rev3260)

RFC 2598 An Expedited Forwarding PHB

RFC 3140 Per-Hop Behavior Identification Codes

TCP/IP

RFC 768 UDP

RFC 1350 The TFTP Protocol (Rev 2)

RFC 791 IP

RFC 792 ICMP

RFC 793 TCP

RFC 826 ARP

RFC 854 Telnet

RFC 951 BootP (rev)

RFC 1519 CIDR

RFC 1542 Clarifications and Extensions for the Bootstrap Protocol

RFC 1812 Requirements for IPv4 Routers

RFC 2347 TFTP Option extension

RFC 2328 TFTP Blocksize option

RFC 2349 TFTP Timeout Interval and Transfer Size option

RFC 2401 Security Architecture for Internet Protocol

draft-ietf-bfd-mib-00.txt Bidirectional Forwarding Detection Management Information Base

draft-ietf-bfd-base-05.txt Bidirectional Forwarding Detection

draft-ietf-bfd-v4v6-1hop-06.txt BFD IPv4 and IPv6 (Single Hop)

draft-ietf-bfd-multihop-06.txt BFD for Multi-hop Paths

VRRP

RFC 2787 Definitions of Managed Objects for the Virtual Router Redundancy Protocol

RFC 3768 Virtual Router Redundancy Protocol

PPP

RFC 1332 PPP IPCP

RFC 1377 PPP OSINLCP

RFC 1638/2878PPP BCP

RFC 1661 PPP (rev RFC2151)

RFC 1662 PPP in HDLC-like Framing

RFC 1989 PPP Link Quality Monitoring

RFC 1990 The PPP Multilink Protocol (MP)

RFC 2516 A Method for Transmitting PPP Over Ethernet

RFC 2615 PPP over SONET/SDH

RFC 2686 The Multi-Class Extension to Multi-Link PPP

RFC 1877 PPP Internet Protocol Control Protocol Extensions for Name Server Addresses

Frame Relay

FRF.1.2 – PVC User-to-Network Interface (UNI) Implementation Agreement

FRF.5 – Frame Relay/ATM PVC Network Interworking Implementation

ANSI T1.617 Annex D, DSS1 – Signaling Specification for Frame Relay Bearer Service

FRF2.2 – PVC Network-to-Network Interface (NNI) Implementation Agreement

ITU-T Q.933 Annex A – Additional procedures for Permanent Virtual Connection (PVC) status management

ATM

RFC 1626 Default IP MTU for use over ATM AAL5

RFC 2514 Definitions of Textual Conventions and OBJECT_IDENTITIES for ATM Management

RFC 2515 Definition of Managed Objects for ATM Management

RFC 2684 Multiprotocol Encapsulation over ATM Adaptation Layer 5

AF-TM-0121.000 Traffic Management Specification Version 4.1

ITU-T Recommendation I.610 – B-ISDN Operation and Maintenance Principles and Functions version 11/95

ITU-T Recommendation I.432.1 – B-ISDN user-network interface – Physical layer specification: General characteristics

GR-1248-CORE – Generic Requirements for Operations of ATM Network Elements (NEs), Issue 3

GR-1113-CORE – Bellcore, Asynchronous Transfer Mode (ATM) and ATM Adaptation Layer (AAL) Protocols Generic Requirements, Issue 1

AF-ILMI-0065.000 Integrated Local Management Interface (ILMI) Version 4.0

AF-TM-0150.00 Addendum to Traffic Management v4.1 optional minimum desired cell rate indication for UBR

AF-PHY-0086.001, Inverse Multiplexing for ATM (IMA) Specification Version 1.1

DHCP

RFC 2131 Dynamic HostConfiguration Protocol (REV)

RFC 3046 DHCP Relay Agent Information Option (Option 82)

RFC 1534 Interoperation between DHCP and BOOTP

VPLS

RFC 4762 Virtual Private LAN Services Using LDP (previously draft-ietf-l2vpn-vpls-ldp-08.txt)

draft-ietf-l2vpn-vpls-mcast-reqts-04.txt

Pseudo-wire

RFC 3985 Pseudo Wire Emulation Edge-to-Edge (PWE3)

RFC 4385 Pseudo Wire Emulation Edge-to-Edge (PWE3) Control Word for Use over an MPLS PSN

RFC 3916 Requirements for Pseudo- Wire Emulation Edge-to-Edge (PWE3)

RFC 4717 Encapsulation Methods for Transport ATM over MPLS Networks (draft-ietf-pwe3-atm-encap-10.txt)

RFC 4816 PWE3 ATM Transparent Cell Transport Service (draft-ietf-pwe3-cell-transport-04.txt)

RFC 4448 Encapsulation Methods for Transport of Ethernet over MPLS Networks (draft-ietf-pwe3-ethernet-encap-11.txt)

RFC 4619 Encapsulation Methods for Transport of Frame Relay over MPLS Networks (draft-ietf-pwe3-frame-relay-07.txt)

RFC 4446 IANA Allocations for PWE3

RFC 4447 Pseudowire Setup and Maintenance Using LDP (draft-ietf-pwe3-control-protocol-17.txt)

RFC 5085, Pseudowire Virtual Circuit Connectivity Verification (VCCV): A Control Channel for Pseudowires

draft-ietf-l2vpn-vpws-iw-oam-02.txt

draft-ietf-pwe3-oam-msg-map-05-txt

draft-ietf-l2vpn-arp-mediation-04.txt

draft-ietf-pwe3-ms-pw-arch-02.txt

draft-ietf-pwe3-segmented-pw-05.txt

draft-hart-pwe3-segmented-pw-vccv-02.txt

draft-muley-dutta-pwe3-redundancy-bit-02.txt

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MFA Forum 9.0.0 The Use of Virtual trunks for ATM/MPLS Control Plane Interworking

MFA Forum 12.0.0 Multiservice Interworking – Ethernet over MPLS

MFA forum 13.0.0 Fault Management for Multiservice Interworking v1.0

MFA Forum 16.0.0 Multiservice Interworking – IP over MPLS

ANCP/L2CP

draft-ietf-ancp-framework-01.txt

draft-ietf-ancp-protocol-00.txt

Circuit emulation

RFC 4553 Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP)

RFC 5086 Structure-Aware Time Division Multiplexed (TDM) Circuit Emulation Service over Packet Switched Network (CESoPSN)

MEF-8 Implementation Agreement for the Emulation of PDH Circuits over Metro Ethernet Networks, October 2004

draft-ietf-pwe3-tdm-control-protocol-extensi-02.txt

SONET/SDH

GR-253-CORE SONET Transport Systems: Common Generic Criteria, Issue 3, September 2000

ITU-G.841 Telecommunication Standardization Section of ITU, Types and Characteristics of SDH Networks Protection Architecture, issued in October 1998 and as augmented by Corrigendum1 issued in July 2002

GR-253-CORE - SONET Transport Systems: Common Generic Criteria, Issue 3, September 2000

RADIUS

RFC 2865 Remote Authentication Dial In User Service

RFC 2866 RADIUS Accounting

SSH

draft-ietf-secsh-architecture.txt SSH Protocol Architecture

draft-ietf-secsh-userauth.txt SSH Authentication Protocol

draft-ietf-secsh-transport.txt SSH Transport Layer Protocol

draft-ietf-secsh-connection.txt SSH Connection Protocol

draft-ietf-secsh-newmodes.txt SSH Transport Layer Encryption Modes

TACACS+

draft-grant-tacacs-02.txt

Network management

ITU-T X.721: Information technology-OSI-Structure of Management Information

ITU-T X.734: Information technology-OSI-Systems Management: Event Report Management Function

M.3100/3120 Equipment and Connection Models

TMF 509/613 Network Connectivity Model

RFC 1157 SNMPv1

RFC 1215 A Convention for Defining Traps for use with the SNMP

RFC 1657 BGP4-MIB

RFC 1724 RIPv2-MIB

RFC 1850 OSPF-MIB

RFC 1907 SNMPv2-MIB

RFC 2011 IP-MIB

RFC 2012 TCP-MIB

RFC 2013 UDP-MIB

RFC 2096 IP-FORWARD-MIB

RFC 2138 RADIUS

RFC 2206 RSVP-MIB

RFC 2452 IPv6 Management Information Base for the Transmission Control Protocol

RFC 2454 IPv6 Management Information Base for the User Datagram Protocol

RFC 2465 Management Information Base for IPv6: Textual Conventions and General Group

RFC 2558 SONET-MIB

RFC 2571 SNMP-FRAMEWORKMIB

RFC 2572 SNMP-MPD-MIB

RFC 2573 SNMP-TARGET-&-NOTIFICATION-MIB

RFC 2574 SNMP-USER-BASED-SMMIB

RFC 2575 SNMP-VIEW-BASEDACM-MIB

RFC 2576 SNMP-COMMUNITY-MIB

RFC 2665 EtherLike-MIB

RFC 2819 RMON-MIB

RFC 2863 IF-MIB

RFC 2864 INVERTED-STACK-MIB

RFC 2987 VRRP-MIB

RFC 3014 NOTIFICATION-LOGMIB

RFC 3019 IP Version 6 Management Information Base for The Multicast Listener Discovery Protocol

RFC 3164 Syslog

RFC 3273 HCRMON-MIB

RFC 3411 An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks

RFC 3412 – Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)

RFC 3413 – Simple Network Management Protocol (SNMP) Applications

RFC 3414 – User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)

RFC 3418 – SNMP MIB

draft-ietf-disman-alarm-mib-04.txt

draft-ietf-ospf-mib-update-04.txt

draft-ietf-mpls-lsr-mib-06.txt

draft-ietf-mpls-te-mib-04.txt

draft-ietf-mpls-ldp-mib-07.txt

draft-ietf-isis-wg-mib-05.txt

IANA-IFType-MIB

IEEE8023-LAG-MIB

Plus support for an extensive array of proprietary MIBs

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